

## WHAT IS CLAIMED IS:

1. A method for conducting a perfusion study, said method comprising:
  - performing an initial full scan of an area of interest in an object; and
  - performing at least one subsequent partial scan of the area of interest to detect motion of a contrast agent.
2. A method in accordance with Claim 1 wherein said performing at least one subsequent partial scan comprises:
  - performing a first full rotation including  $n$  sub-rotations, where no scanning is performed for all sub-rotations except an  $i$ th sub-rotation in which a scan is performed; and
  - performing a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed.
3. A method in accordance with Claim 2 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed wherein  $m = n$ , and  $j = i$ .
4. A method in accordance with Claim 2 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed wherein  $m = n$ , and  $j \neq i$ .
5. A method in accordance with Claim 2 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed wherein  $m \neq n$ , and  $j = i$ .
6. A method in accordance with Claim 2 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  sub-rotations where no

scanning is performed for all sub-rotations except a jth sub-rotation in which a scan is performed wherein  $m \neq n$ , and  $j \neq i$ .

7. A method in accordance with Claim 2 further comprising:

collecting projection data from the partial scans;

forming a partial projection dataset from the collected projection data;

interpolating the partial projection data to estimate a complete projection dataset from the partial dataset; and

reconstructing images from the estimated complete projection dataset.

8. A method in accordance with Claim 1 wherein said performing at least one subsequent partial scan comprises:

performing a first full rotation including  $n$  view-indexes, where no scanning is performed for all view-indexes except every  $i$ th view-index beginning with a view-index  $q$  in which a scan is performed; and

performing a second full rotation including  $m$  view-indexes where no scanning is performed for all view-indexes except every  $j$ th view-index beginning with a view-index  $r$  in which a scan is performed.

9. A method in accordance with Claim 8 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  view-indexes where no scanning is performed for all view-indexes except every  $j$ th view-index beginning with a view-index  $r$  in which a scan is performed, wherein  $r = q$ .

10. A method in accordance with Claim 8 wherein said performing a second full rotation comprises performing a second full rotation including  $m$  view-indexes where no scanning is performed for all view-indexes except every  $j$ th view-index beginning with a view-index  $r$  in which a scan is performed, wherein  $r \neq q$ .

11. A method in accordance with Claim 8 further comprising:

collecting projection data from the partial scans;

reconstructing at least two images from the collected projection data;

extrapolating an initial guess image based on the at least two images; and

constructing subsequent images based on the extrapolated initial guess image.

12. A Computed Tomography (CT) System comprising:

a radiation source;

a radiation detector; and

a computer coupled to said radiation source and said radiation detector, said computer configured to:

perform an initial full scan of an area of interest in an object; and

perform at least one subsequent partial scan of the area of interest to detect motion of a contrast agent.

13. A system in accordance with Claim 12, wherein said computer further configured to:

perform a first full rotation including  $n$  sub-rotations, where no scanning is performed for all sub-rotations except an  $i$ th sub-rotation in which a scan is performed; and

perform a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed.

14. A system in accordance with Claim 13 wherein  $m = n$  and  $j = i$ .

15. A system in accordance with Claim 13 wherein  $m = n$  and  $j \neq i$ .

16. A system in accordance with Claim 13 wherein  $m \neq n$  and  $j = i$ .
17. A system in accordance with Claim 13 wherein  $m \neq n$  and  $j \neq i$ .
18. A system in accordance with Claim 12, wherein said computer configured to perform at least one subsequent partial scan comprises a computer configured to:
  - perform a first full rotation including  $n$  view-indexes, where no scanning is performed for all view-indexes except every  $i$ th view-index beginning with a view-index  $q$  in which a scan is performed; and
  - perform a second full rotation including  $m$  view-indexes where no scanning is performed for all view-indexes except every  $j$ th view-index beginning with a view-index  $r$  in which a scan is performed.
19. A system in accordance with Claim 18 wherein  $r = q$ .
20. A system in accordance with Claim 18 wherein  $r \neq q$ .
21. A computer readable medium encoded with a program configured to instruct a computer to:
  - perform an initial full scan of an area of interest in an object; and
  - perform at least one subsequent partial scan of the area of interest to detect motion of a contrast agent.
22. A computer readable medium in accordance with Claim 21 wherein said program further configured to instruct the computer to:
  - perform a first full rotation including  $n$  sub-rotations, where no scanning is performed for all sub-rotations except an  $i$ th sub-rotation in which a scan is performed; and
  - perform a second full rotation including  $m$  sub-rotations where no scanning is performed for all sub-rotations except a  $j$ th sub-rotation in which a scan is performed.

23. A computer readable medium in accordance with Claim 21 wherein said program further configured to instruct the computer to:

perform a first full rotation including n view-indexes, where no scanning is performed for all view-indexes except every ith view-index beginning with a view-index q in which a scan is performed; and

perform a second full rotation including m view-indexes where no scanning is performed for all view-indexes except every jth view-index beginning with a view-index r in which a scan is performed.